MP MASTER
MA29850

TECHNICAL MANUAL

MODEL GPD550A
FAST SPECTRUM ANALYZER

Scientific-Atlanta Inc.
Signal Processing Systems

411318 Rev A

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SAFETY SUMMARY

GPD550A FAST SPECTRUM ANALYZER

1. GENERAL

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this technical manual. It is the user's responsibility to understand and apply these safety precautions during all phases of operation, service, and repair of this system. Failure to comply with these precautions or with specific warnings elsewhere in this technical manual violates safety standards of design, manufacture, and intended use of this system.

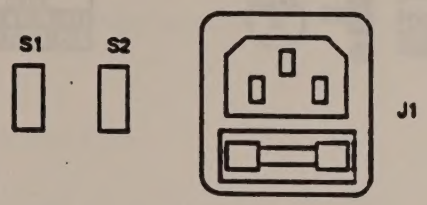
2. GROUND THE SYSTEM

To minimize shock hazard, system chassis and equipment cabinet must be connected to an electrical ground. The GPD550A is equipped with a three-conductor AC power cable. This power cable must be installed in accordance with installation procedures provided.

CAUTION

Verify proper switch settings and fuse values for the appropriate line voltage, before applying power to the instrument.

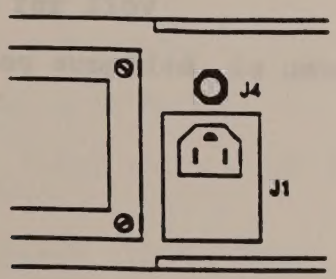
Unit 1 - Power Module



S1 and S2 provide switching of primary power input circuits for either 115 Vac or 230 Vac operation. Screwdriver blade slots are up for 115 Vac operation and down for 230 Vac operation. Both switches must always be in the same position. One switch is needed for the fan, the other is for the power transformer.

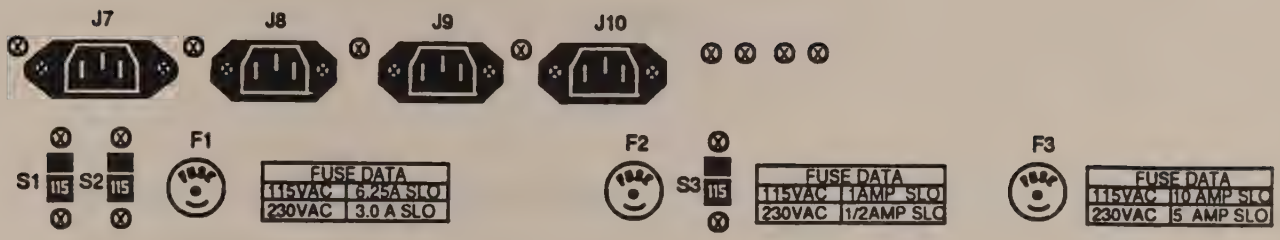
Primary Power fuse: 3AG, 25V, slow-blow, 10.0 amp.

Unit 2 - Power Module



The power fuse and input voltage selector are integrated as part of the removable module. The power fuse is type 3AG, 250V, slow-blow, 1 amp and the input voltage selector is a reversible plate that slides into the power module. The arrow inside the window points to the selected input voltage.

Unit 3 - Power Input Group



Switches S1, S2 and S3 must be switched for 230V operation.

Fuse F1 is used to protect Unit 3

6.25 amp SLO for 115V
3.0 amp SLO for 230V

Fuse F2 is used to protect the X-Y scope.

1 amp SLO for 115V
1/2 amp SLO for 230V

Fuse F3 is used to protect Unit 1 and Unit 2

10 amp SLO for 115V
5 amp SLO for 230V

A 15-amp power cord, as supplied, is used as the main power cord to Unit 3 (PN 42934100).

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SECTION 1

GENERAL INFORMATION

1.0 INTRODUCTION

The GPD550A is a Digital Signal Analyzer with a DC-12 MHz bandwidth. It is designed for mounting in a standard 19-inch rack and consists of three chassis: Input Signal Conditioning with Analog-to-Digital conversion (Unit 2), Signal Processing (Unit 1), and Real Time/Waterfall with Display Cursor (Unit 3). The user controls the system via switches on the front panels of Unit 1 and Unit 3.

The GPD550A can also be remotely controlled by the built-in IEEE-488 General Purpose Interface Bus (GPIB). See Figure 1.1 for GPD550A System drawing.

Processed data may be sent to a computer via the DMA port at processing speeds of 1 MHz to 1.7 MHz, and also through the GPIB port.

1.1 CHARACTERISTICS

The following features are provided as standard in the GPD550A.

1.1.1 UNIT 1 (Digital Filter and FFT Processor)

a. Front panel selection of 16 frequency ranges from 1.95 KHz to 12 MHz full scale, with provisions for GPIB selection of 37 frequency ranges.

b. Center frequency selection in steps of approximately one-tenth of the resolution.

c. Front panel selection of six resolution values from 100 (for a 128 transform size) to 3200 (for a 4096 transform size).

d. A built-in averager for statistical measurements in the frequency domain. Averaging can be performed on a selected number of averages (up to 512) in linear mode or can continue indefinitely, until manually stopped or reset, in both exponential and peak mode.

e. A peak hold mode which detects and stores the peak value of each of the displayed bin locations.

Figure 1.1. GPD550A Simplified Block

f. Bar graph indicator of input signal level, including overload (OVR) and underload (UNDR).

g. Built-in test signal.

h. Built-in GPIB interface.

i. Rear panel connection for digital data output via DMA.

1.1.2 UNIT 2 (Input Conditioner and A/D Converter)

Rear panel connection for analog input.

1.1.3 UNIT 3 (Display Unit)

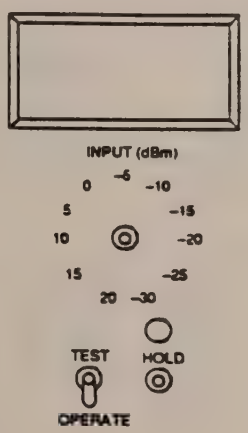
Waterfall and X-Y display.

1.2 FRONT PANEL FUNCTION DESCRIPTION

Figure 1.2 is a front view of the Model GPD550A. The front panel controls and indicators are arranged in functional groups.

1.2.1 UNIT 1

1.2.1.1 INPUT Group



SIGNAL LEVEL Indicator

Indicates the relative amplitude of the input signal. UNDR indicates a "too low" input signal. OVR indicates a "too high" input signal and the signal exceeds the level at which the A/D converter can operate properly. At the top are GPIB indicators that illuminate when the GPIB is performing certain operations.

INPUT (dBm) Gain/Attenuation Selector

Selects Input gain (o dBm to 30 dBm) or attenuation (0 dBm to 20 dBm). This gain or attenuation is applied to the input signal in order to normalize the amplitude of the signal to the A/D converter.

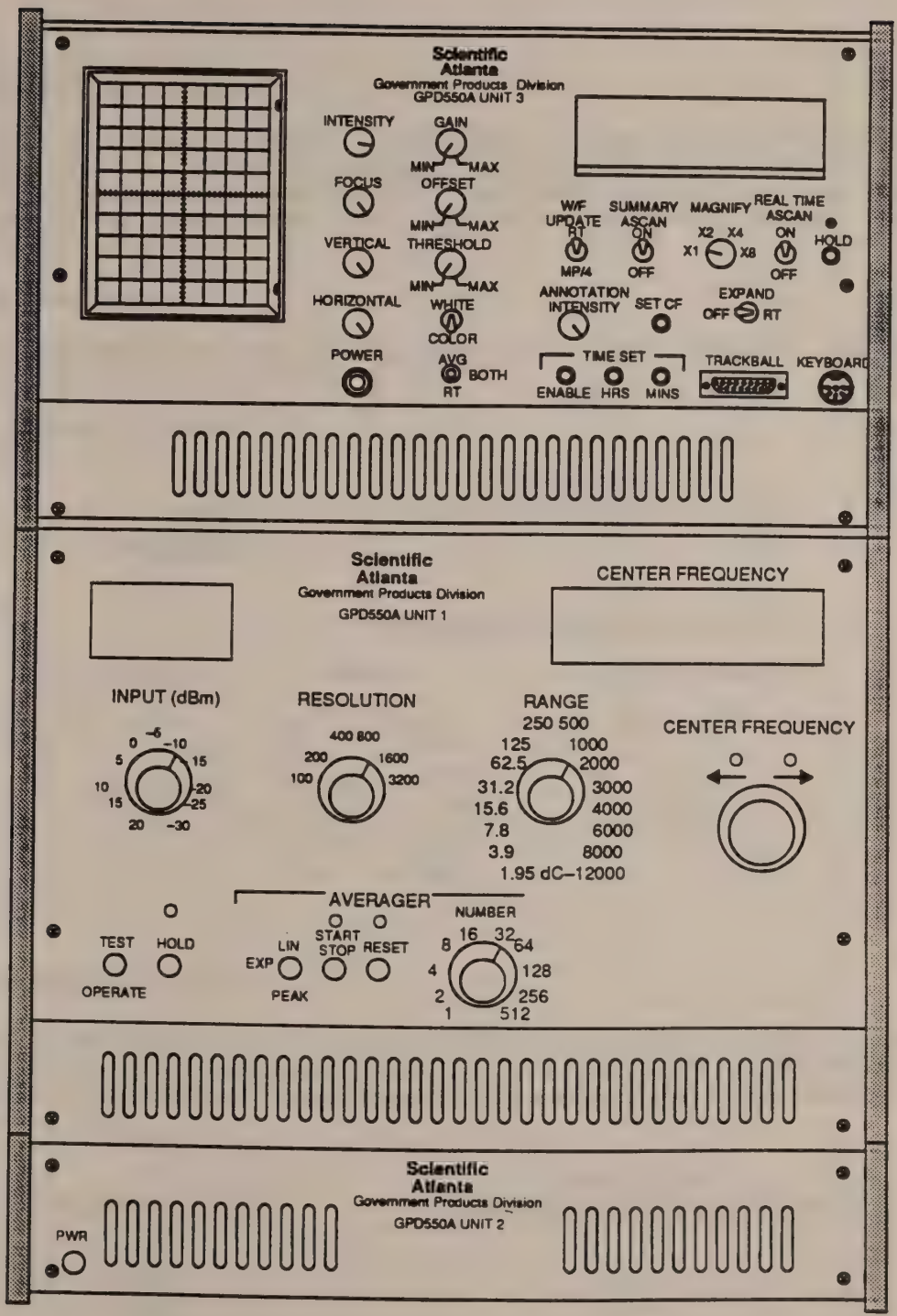


Figure 1.2. GPD550A System

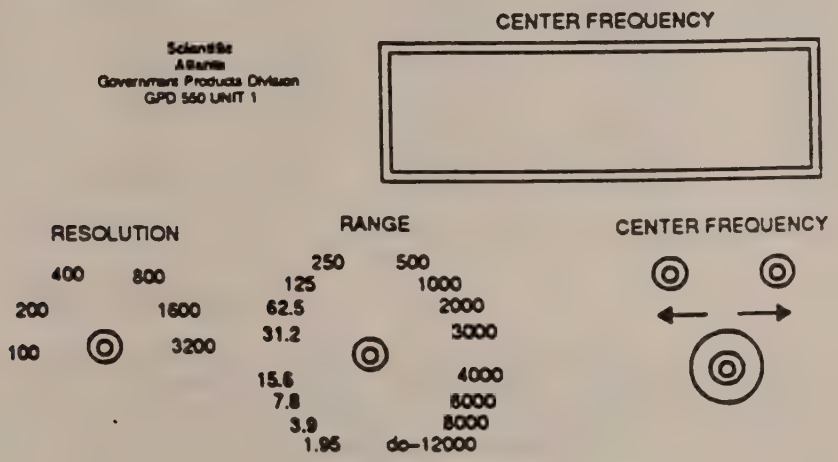
OPERATE/TEST Selector

Selects the input signal or connects the internal test signal to the input. The input remains terminated, but a test signal is substituted for the input. The test signal is a 480 KHz pulse train such that all harmonics of this signal are present.

HOLD Pushbutton

Prevents new data from being input into input memory. LED is illuminated when in HOLD.

1.2.1.2 ANALYSIS Group



RESOLUTION Selector

Determines the number of cells to be displayed and the transform size. The number of cells displayed is equal to the resolution and the transform size is equal to the resolution times 1.28.

Transform Size	Resolution (Number of Cells Displayed
4096	3200
2048	1600
1024	800
512	400
256	200
128	100

Table 1.1. Cell Size in Hz Given Range and Resolution

Range (Hz)	Resolution (Number of Cells) 100	200	400	800	1600	3200
12M	120K	60K	30K	15K	7500	3750
8M	80K	40K	20K	10K	5000	2500
6M	60K	30K	15K	7500	3750	1875
4M	40K	20K	10K	5000	2500	1250
3M	30K	15K	7500	3750	1875	937.5
2M	20K	10K	5000	2500	1250	625
1M	10K	5000	2500	1250	625	312.5
500K	5000	2500	1250	625	312.5	156.25
250K	2500	1250	625	312.5	156.5	78.13
125K	1250	625	312.5	156.5	78.13	39.06
62.5K	625	312	156.5	78.13	39.06	19.53
31.2K	312	156	78	39	19.5	9.75
15.6K	156	78	39	19.5	9.75	4.875
7.8K	78	39	19.5	9.75	4.88	2.48
3.9K	39	19.5	9.75	4.88	2.44	1.22
1.95K	19.5	9.75	4.88	2.44	1.22	.61

RANGE (KHz) Selector

Selects the analysis frequency range from 1.95 KHz to 12 MHz. Additional ranges may be selected remotely via the GPIB connector on the rear panel. The selected range is in the Baseband mode, and the Baseband bandwidth is from 0 Hz to the indicated value on the front panel when the center frequency selector is set to Bandwidth/2.

CENTER FREQUENCY (Hz) Knob

The CENTER FREQUENCY (Hz) knob selects values from DC to 12 MHz, except when Range switch is DC-12 MHz during which it defaults to 6 MHz.

Center Frequency may be changed in two ways:

(1) Center Frequency buttons/knob on Unit 1. The buttons allow pulse/high speed operation, while the knob gives fine resolution.

(2) Set CF button on Unit 3 moves the frequency that the cursor is located at to the center of the display. Center Frequency selection is limited from DC to 12 MHz. An 'Out-of-Range' will light when any portion of the spectrum is invalid.

CENTER FREQUENCY (Hz) Display

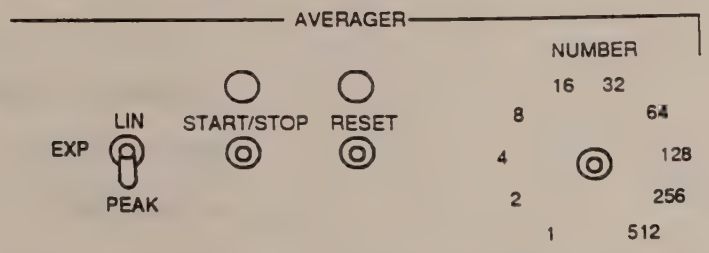
Provides a nine-digit LED readout of the Center Frequency location.

1.2.1.3 **OUTPUT Group.** The OUTPUT group consists of the following indicator.

GPIB Function Indicator

The GPIB indicators are placed above the Input signal, under/over range indicators. The appropriate indicators illuminate when the GPIB is performing certain operations or when the GPIB has placed the GPD550A into the REMOTE mode. Refer to the GPD550A GPIB document for complete details.

1.2.1.4 **AVERAGER Group**



START/STOP Pushbutton

Starts or stops the selected averaging process. After the averaging is completed (LIN mode) the averager must be reset by pushing the RESET pushbutton before it can be restarted by pushing the START/STOP pushbutton. The START/STOP LED is lit when the averager is running, and is turned off in LIN MODE when the set of ensembles has completed averaging.

RESET Pushbutton

Stops the selected averaging process, clears the averager memory, and then lights the RESET LED.

AVERAGER MODE Selector

LIN Linear averaging. Averages the number of ensembles selected and holds the results in the averager memory.

EXPO Exponential averaging. Continuous averaging with time constant determined by the NUMBER OF AVERAGES selector.

PEAK Continuous averaging with real time data compared cell-by-cell with data in the averager memory. Averager memory is updated only when the real time data is greater.

If the averager is operating in either the EXPO or PEAK mode and the mode selector is changed to the LIN mode, the averager will be automatically RESET before the LIN mode can start to operate in the newly selected mode. There is no resetting if the averager is operating in the LIN mode and the mode selector is changed to either the EXPO or PEAK mode.

In Waterfall Update mode, Averager will automatically revert to PEAK mode.

NUMBER OF AVERAGES Selector

Selects the number of ensembles, in binary steps from 1 to 512, to be averaged.

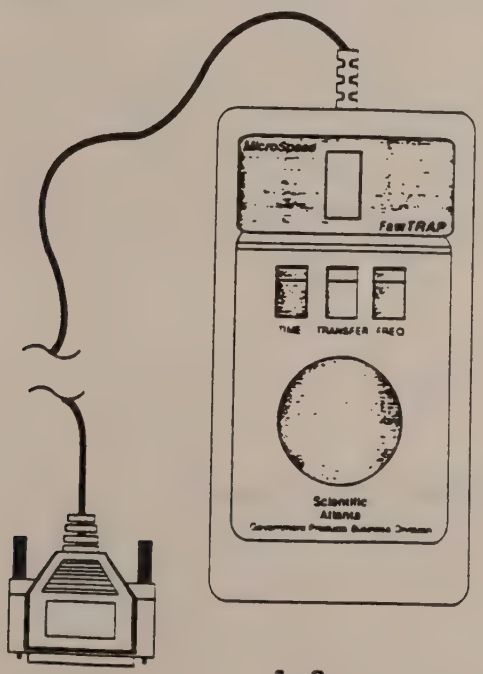
1.2.2 UNIT 2

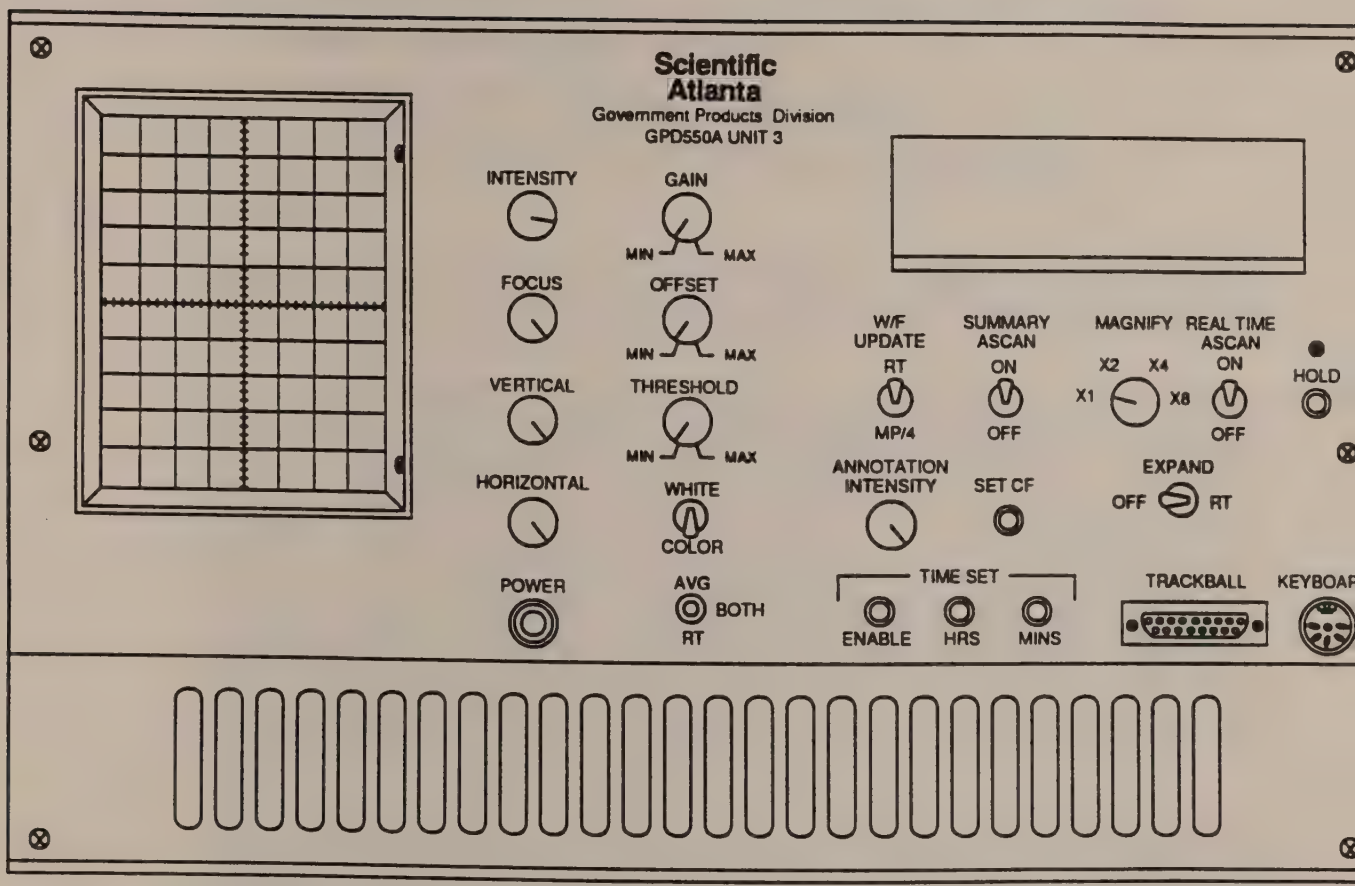
LED POWER Indicator

Illuminated when ON.

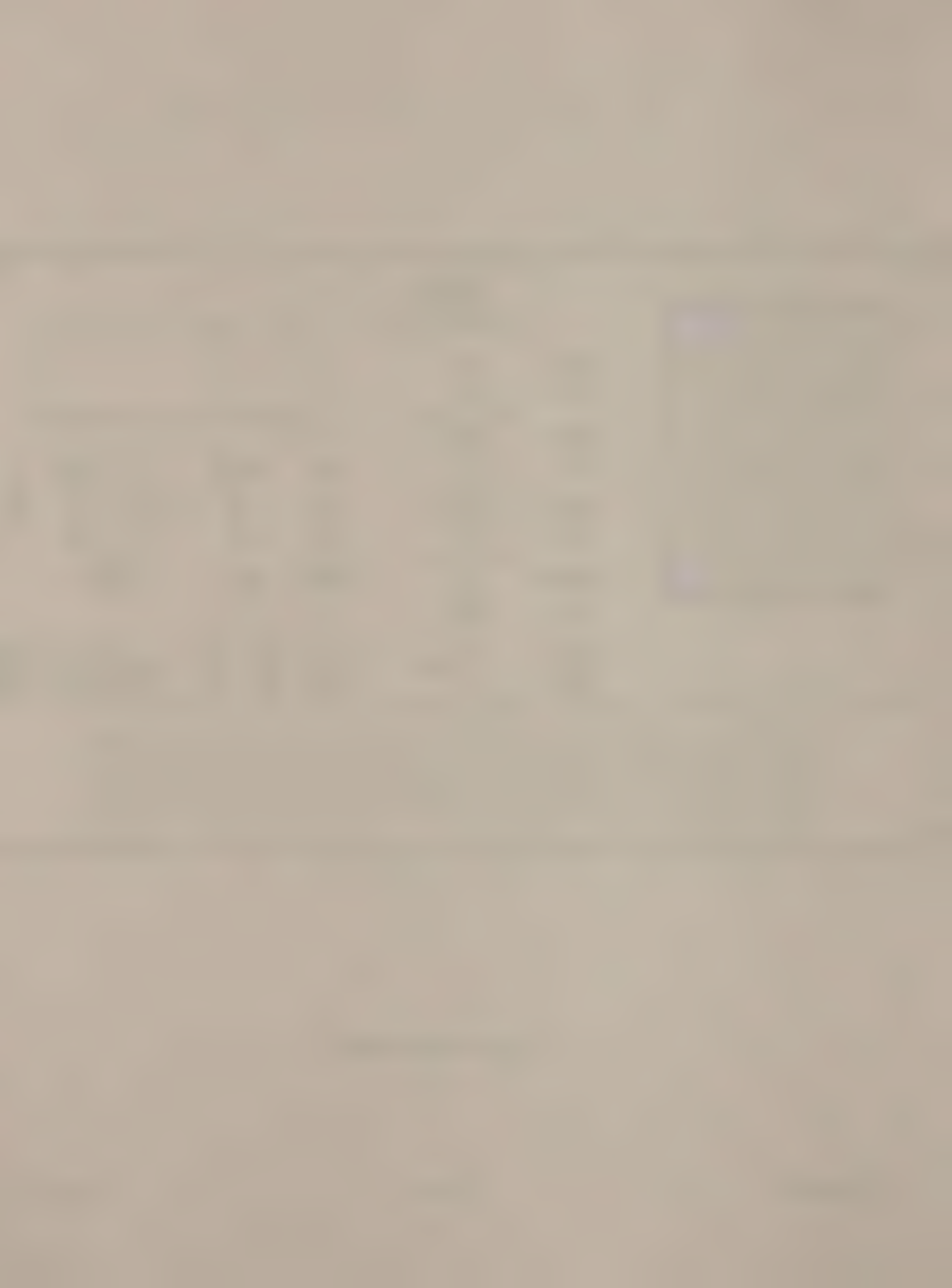
1.2.3 UNIT 3 (Display Unit)

1.2.3.1 User Interface. The user interface consists of a track-ball and front panel controls.





550A FRONT PANEL



1.2.3.2 **Trackball.** The trackball performs several user functions:

a. Transfer REAL TIME data block represented by Average data in Summary area, to Real Time display.

b. Set/Reset Time and Frequency reference cursors to read Time and Frequency.

c. Scroll and pan REAL TIME data.

d. Line separation on Real Time screen.

e. Control cursor movement and Reference Cursors.

Transfer

Press once to transfer active cursor control from Summary display to Real Time display. Press again to return active cursor control to Summary display.

With active cursor on Summary side, two parallel green lines are observed, indicating the Real Time display data coverage, should a transfer occur. When the Transfer button is pressed twice in succession (about 3/4 sec. apart), the parallel cursor lines will become a yellow box with red crosshair cursors inside. The active cursor moves to the Real Time display. The yellow box outlines the Real Time data, non-averaged individual spectrums, that have been transferred to the Real Time display. The red cursors in the box moves in synchronization with the active cursors on the REAL TIME data. Thus, the cursor placed on an anomaly in the REAL TIME data will coincide with the anomaly in the yellow box on the Summary screen, thus providing accurate positioning of the anomaly in the 30 Mbyte memory.

The transfer button pressed twice in quick succession, when the active cursor is on Real Time display, will cause no action. The active cursor may be moved between Summary and Real Time display screen without destroying the data.

Scroll Data

Scrolling feature applies to REAL TIME DATA ONLY.

Scroll 'Hold' Mode

A data block represented by a section of the Summary is transferred to Real Time display. The rolling of the trackball in the 'up' direction scrolls REAL TIME data, from top of Memory. This is represented by a box moving in the upward direction on

the Summary display. The rolling of the trackball in the 'down' direction scrolls REAL TIME data, from bottom of Memory. This is represented by a box moving in the downward direction of the Summary display. The scroll stops when the lower or upper boundary of the Summary is reached.

Scroll 'Update' Mode

With the Summary updating, a REAL TIME block represented by a section of the Summary may be transferred to Real Time display. The user may scroll new data from top of Memory - represented by the upward movement of the box on the summary display. New data from bottom of Memory may also be scrolled on Real Time display. This is represented by the bottom of the Summary display. The limit is the bottom of the Summary display. The box will eventually scroll off the bottom of the display.

Pan Data

Panning moves REAL TIME data left or right on the screen when FFT resolution is 800, 1600, or 3200. The Summary and Real Time displays are both 400 points each. The Summary display utilizes a peak pick method of displaying 400 points when GPD550A resolution is 800, 1600, or 3200. The cursor box is therefore 1/2, 1/4, or 1/8 in width and outlines the REAL TIME data that will be transferred to the Real Time display. Once the transfer is complete the cursor box may be panned, moved left or right, to observe different portions of the 800, 1600, or 3200 data points on the Real Time display. Panning is also effective in viewing hidden data in the 'Magnify' mode.

Time

Pressing 'Time' activates the horizontal reference cursor. The yellow reference cursor and its annotation are activated simultaneously. The delta time measurement may be made by rolling the Trackball in the upward or downward direction. The yellow reference cursor remains fixed and the green active cursor moves for delta time measurements. The Time measurement retains its accuracy even after the original reference data scrolls of the screen. Reference cursors may be removed by pressing 'Time' again.

Frequency

Pressing 'Freq' activates the vertical reference cursor. The yellow reference cursor and its annotation are activated simultaneously. The delta frequency measurement may be made by rolling the Trackball in the left/right direction. The yellow reference cursor remains fixed and the green active cursor moves for delta frequency measurements. The frequency

measurement retains it accuracy even after the original reference data is panned of the screen. Reference cursors may be removed by pressing 'Freq' again.

Line Separation

The 'Separation' wheel may be used to space the spectrum lines by putting 1, 2, 4, or 8 blank lines between each spectrum. Data may be panned or scrolled during line separation.

Front Panel Controls

a. Power. Turns system Power ON/OFF.

b. X-Y Scope controls:

HORIZONTAL

Clockwise rotation moves the display to the right; counter-clockwise rotation slides the display to the left.

VERTICAL

When this knob is turned clockwise, the baseline is moved up the screen; for counterclockwise motion, the baseline is moved down.

FOCUS

Focuses the display.

INTENSITY

When rotated clockwise, the display screen is brightened. Conversely, when rotated counterclockwise, the screen dims.

c.

Switch selects display for X-Y scope.

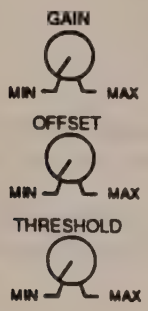
RT - Real Time data single display.
AVG - Avg Data single display

Grid lines in single display indicate 10 dB/step. Both - have Dual display with Average display on top and Real Time display on bottom. Grid lines indicate 20 dB/step.

d.

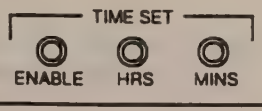
Color or gray scale selectable from a 256 palette.

e. Offset, Threshold, Gain



Sets the baseline clamp and contrast for the display. The Offset control will adjust the noise floor to be observed while the Threshold and Gain controls will minimize or maximize the contrast. The data stored in memory is unaffected by this control. The Display Map bar is a vertical bar left of the Real Time Ascan display and is indicative of the mapping these controls provide.

f. Time Set



The Time may be set manually or synchronized externally by connecting the Time code generator. To set the Time manually, press 'Enable'. The display turns yellow.

Press 'Hrs' to set the hours, and 'Min' to set the minutes. When the desired time is set, press 'Enable' to exit Time set mode and the display will turn white. The clock is now operational.

The rear panel of the GPD550A has a Time code input which will accept 20-bit BCD data representing HRS and MIN.

g. Intensity

The intensity of the annotation may be increased or decreased by varying this control. The 'MIN' setting renders all annotation black, while the 'MAX' setting brings the cursors to its brightest level.

h. WF UPDATE

RT. Waterfall is updated at FFT processor rate, thus causing smearing at the Lower frequency ranges.

MP/4. For frequency ranges <500K, the Waterfall is updated at memory period/4.

Set CF

Moves the frequency that the cursor is located at to the center of the display. Selecting a CF near DC or 12 MHz may turn the Overange (OR) indicator on.

Summary Ascan ON/OFF

Turns Ascan "ON" or "OFF" on Summary display. In the 'OFF' position, 1000 lines of averaged waterfall data is displayed. In the 'ON' position, 743 lines of averaged data is displayed with Ascan.

The spectrum observed on Ascan display depends on the cursor position on the Summary display.

EXPAND OFF/RT

Expands Real Time display to 800 lines. The annotation is placed on the left side of the screen.

The viewing area of the Summary display is outlined by a yellow box cursor. With Magnify switch at x1, the box cursor will be 1/2 or 1/4 the width of the Summary display in 1600 and 3200 point resolution, and full width of Summary display during 100, 200, 400, and 800 point resolution. During display pan or scroll mode, the box cursor will move on the Summary side to represent data on the Real Time side.

Summary/Real Time Display with x1 Magnification

RESOLUTION	SUMMARY	REAL TIME
100	Expand by 8	Expand by 8
200	Expand by 4	Expand by 4
400	Expand by 2	Expand by 2
800	800 pts	800 pts
* 1600	Peak-Pick to 800	View any 800 Real Time Points
* 3200	Peak-Pick to 800	view any 800 Real Time Points

*Time window may be moved horizontally to cover any segment of summary display.

The width of Summary window viewed through the Real Time display varies with different magnification settings.

MAGNIFY

The Magnify switch zooms in on a portion of the Summary display and the expanded REAL TIME data is observed on the Real Time display.

Table 1-2. Width of Summary Window to be Magnified When Expand is OFF

Resolution	x1	x2	x4	x8
3200	1/8	1/16	1/32	1/64
1600	1/4	1/8	1/16	1/32
800	1/2	1/4	1/8	1/16
400	FULL	1/2	1/4	1/8
200	FULL	1/2	1/4	1/4
100	FULL	1/2	1/2	1/2
	Width of Summary Window			

Table 1-3. Width of Summary Window to be Magnified When Expand is ON

Resolution	x1	x2	x4	x8
3200	1/4	1/8	1/16	1/32
1600	1/2	1/4	1/8	1/16
800	FULL	1/2	1/4	1/8
400	FULL	1/2	1/4	1/4
200	FULL	1/2	1/2	1/2
100	FULL	FULL	FULL	FULL
	Width of Summary Window			

EXPAND

Normal operation mode is with Expand switch in the OFF position. Summary and Real Time displays are 400 points wide. Transfer of Real Time Data blocks is executed in the Expand OFF mode.

Positioning the Expand switch in RT puts an 800 line Real Time display on the monitor with annotation on the left. The switches and d trackball operation is identical to the 400 point mode.

Real Time - Ascan ON/OFF

Turns Ascan "ON" or "OFF" on Real Time display. In the 'OFF' position, 1000 lines of Real Time Waterfall data is displayed. With Ascan 'ON', 743 lines of Real Time Waterfall data is displayed, with Ascan.

The spectrum observed on Ascan display depends on the cursor position on the Real Time display.

HOLD

Pressing 'Hold' prevents new data from updating waterfall memory and turns the 'Hold' LED on. Also placing the waterfall in 'Hold' reverts averager control back to the GPD550A. During waterfall 'Update', 'Hold' LED off, the averager is under waterfall control, and in peak-recycle mode. The recycle rate is determined by Summary scroll rate on the monitor and frequency range setting.

Trackball

Keyboard

A keyboard interface connector is adjacent to the trackball connector.

CURSOR FREQUENCY (Hz) and AMPLITUDE Display

Provides a nine-digit LED readout of the frequency at the cursor location and a three-digit display of the cursor amplitude and OUT OF RANGE bar LED's that light up when the screen has an invalid display (i.e., any frequency displayed below DC or above 12 MHz.

1.3 REAR PANEL FUNCTIONAL DESCRIPTION

1.3.1 UNIT 1

Figure 1.3 is a rear view of Model GPD550A Unit 1.

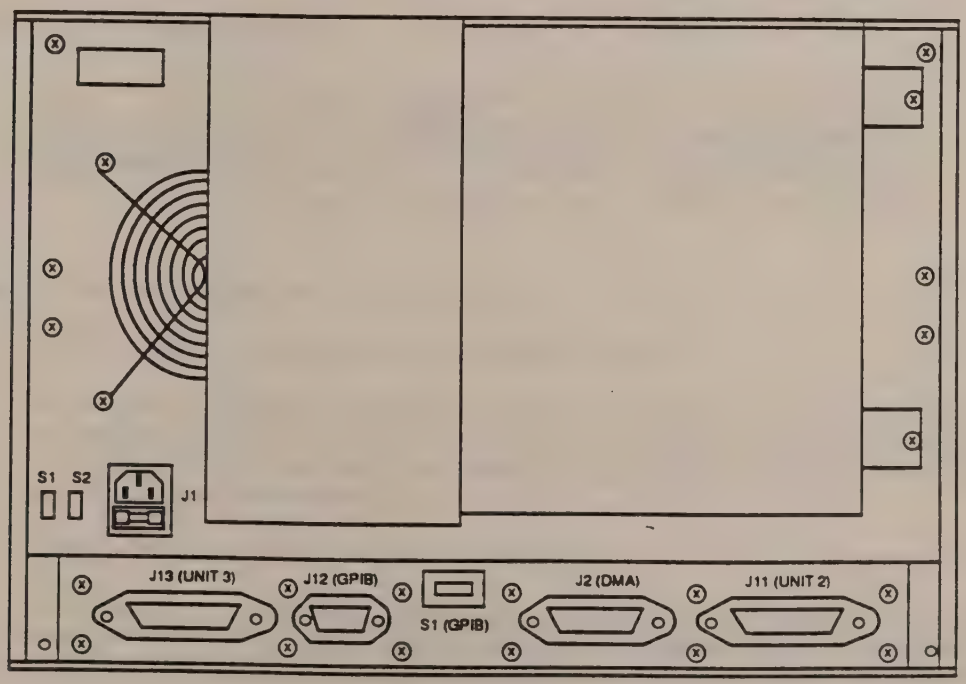
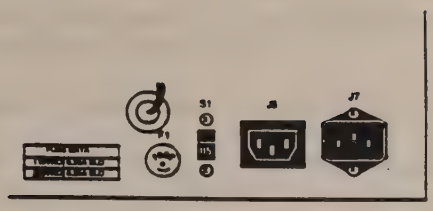


Figure 1.3. GPD550A Unit 1 Rear View

1.3.1.1 Power Input Group



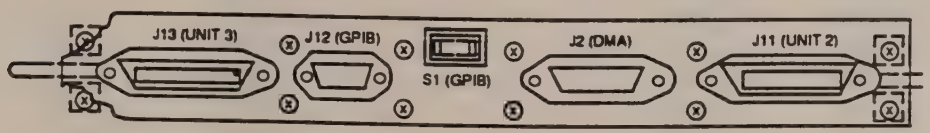
S1 and S2 provide switching of primary power input circuits for either 115 Vac or 230 Vac operation. Screwdriver blade slots are up for 115 Vac operation and down for 230 Vac operation. Both switches must always be in the same position. One switch is needed for the fan, the other is for the power transformer.

The primary power fuse is 10.0 amp, 250 volt with the fuse container snapping into the AC power receptacle.

Primary Power Fuse: 3AG, 250V, slow-blow, 10.0 amp.

Power Connector: Accepts 3-wire female plug and cable (supplied) for applying 115/230 Vac, 50 to 60 Hz primary input power. Center terminal is chassis ground.

1.3.1.2 D Connectors



These are D-miniature connectors

DMA Output Connector - J2 (36 pins)

Provides direct memory access digital data output to an external device. Table 1-4 shows the pin assignments for this connector. Refer to the GPD550A DMA Application Note (Appendix A) for complete details.

GPIB Connector - J12 (24 pins)

Provides a means of transferring digital data to an external computer. Refer to GPD550A GPIB document for complete details. Table 1-5 shows the pin arrangement for this connector.

GPIB Dip Switch - S1

Selects the GPIB address of the GPD550A. Refer to the GPIB document for complete details.

GPD550A Interface Connector - J13 (50 pins, cable supplied)

Provides digital data input to Unit 3 for a frequency range up to 12 MHz. Table 1-6 shows the pin assignments for this connector.

A/D Connector - J11 (50 pins, cable supplied)

Provides a means of entering digitized data from the A/D converter in Unit 2. Table 1-7 shows the pin assignments for this connector.

Table 1-4. Unit 1 DMA Output Connector Functions - J2

PIN	FUNCTION	PIN	FUNCTION
J02_1	DMA 0	J02_19	DMA 0'
J02_2	DMA 1	J02_20	DMA 1'
J02_3	DMA 2	J02_21	DMA 2'
J02_4	DMA 8	J02_22	DMA 8'
J02_5	DMA 9	JO2_23	DMA 9'
J02_6	DMA10	J02_24	DMA10'
J02_7	DMA11	J02_25	DMA11'
J02_8	DMA12	J02_26	DMA12'
J02_9	DMA13	J02_27	DMA13'
J02_10	DMA14	J02_28	DMA14'
J02_11	DMA15	J02_29	DMA15'
J02_12	DMA16	J02_30	DMA16'
J02_13	GNDE	J02_31	GNDE
J02_14	LD DISP	J02_32	LD DISP'
J02_17	SWEEP 1	J02_35	SWEEP 1'

Table 1-5. Unit 1 GPIB Interface Connector Functions - J12

PIN	FUNCTION	PIN	FUNCTION
01	DI01	13	DI05
02	DI02	14	DIO6
03	DI03	15	DIO7
04	DI04	16	DI08
05	EOI	17	REN
06	DAV	18	GNDD
07	NRFD	19	GNDD
08	NDAC	20	GNDD
09	IFC	21	GNDD
10	SRQ	22	GNDD
11	ATN	23	GNDD
12		24	GNDD

Table 1-6. Unit 1 Interface Connector Functions - J13 (Connects to Unit 3)

PIN	FUNCTION	PIN	FUNCTION
1	OUT16	26	OUT16'
2	OUT15	27	OUT15'
3	OUT14	28	OUT14'
4	OUT13	29	OUT13'
5	OUT12	30	OUT12'
6	OUT11	31	OUT11'
7	OUT10	32	OUT10'
8	OUT 9	33	OUT 9'
9	OUT 8	34	OUT 8'
10	OUT 7	35	OUT 7'
11	OUT 6	36	OUT 6'
12	OUT 5	37	OUT 5'
13	GND	38	GND
14	SL CLK	39	SL CLK'
15	SL ADDR	40	SL ADDR'
16	SL DATA	41	SL DATA
17	SL OUT	42	SL OUT'
18	BPKDONE	43	BPKDONE'
19	SWP1	44	SWP1'
20	SWP2	45	SWP2'
21	LD DISP	46	LD DISP'
22	SL3 CLK	47	SL3 CLK'
23	SL3 ADDR	48	SL3 ADDR'
24	SL3 DATA	49	SL3 DATA'
25	SL3 OUT	50	SL3 OUT'

Table 1-7. Unit 1 A/D Connector Function - J1
(Connects to Unit 2)

PIN	FUNCTION	PIN	FUNCTION
1		26	
2		27	
3	BIT10	28	BIT10'
4	BIT 9	29	BIT 9'
5	BIT 8	30	BIT 8'
6	BIT 7	31	BIT 7'
7	BIT 6	32	BIT 6'
8	BIT 5	33	BIT 5'
9	BIT 4	34	BIT 4'
10	BIT 3	35	BIT 3'
11	BIT 2	36	BIT 2'
12	BIT 1	37	BIT 1'
13	OSC	38	OSC'
14	OVERLOAD'	39	GNDA
15	G1	40	GNDA
16	G2	41	GNDA
17	G3	42	GNDA
18	G4	43	GNDA
19		44	GNDA
20		45	GNDA
21		46	GNDA
22		47	GNDA
23		48	GNDA
24		49	GNDA
25		50	GNDA

1.3.2 UNIT 2

Figure 1.4 is a rear view of Model GPD550A Unit 2.

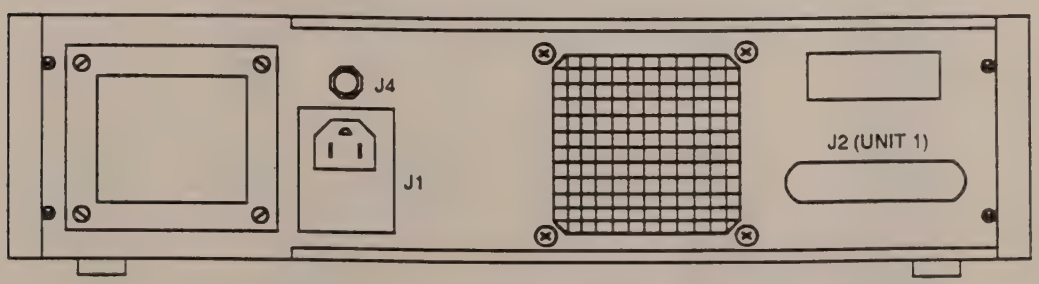


Figure 1.4. GPD550A Unit 2 Rear View

1.3.2.1 **Input BNC Connector (J4).** Accepts analog data input signals for analysis.

1.3.2.2 **Power Entry Module (J1).** Accepts 3-wire female plug and cable (supplied) from Unit 3 for applying switched primary input power. Center terminal is chassis ground. The power fuse and input voltage selector are integrated as part of the removable module. The power fuse is type 3AG, 250V, slow-blow, 1 amp and the input voltage selector is a reversible plate that slides into the power module. The arrow inside the window points to the selected input voltage.

1.3.2.3 **A/D Connector - J2 (50 pins, cable supplied).** Provides a means of transferring digitized data to the GPD550A. This connector shares the same pin assignment as the A/D connector J11 of Unit 1. Refer to Table 1-8 for pin assignments for this connector.

Table 1-8. Unit 2 A/D Connector Function - J2
(Connects to Unit 1)

PIN	FUNCTION	PIN	FUNCTION
1		26	
2		27	
3	BIT10	28	BIT10'
4	BIT 9	29	BIT 9'
5	BIT 8	30	BIT 8'
6	BIT 7	31	BIT 7'
7	BIT 6	32	BIT 6'
8	BIT 5	33	BIT 5'
9	BIT 4	34	BIT 4'
10	BIT 3	35	BIT 3'
11	BIT 2	36	BIT 2'
12	BIT 1	37	BIT 1'
13	OSC	38	OSC'
14	OVERLOAD'	39	GNDA
15	G1	40	GNDA
16	G2	41	GNDA
17	G3	42	GNDA
18	G4	43	GNDA
19		44	GNDA
20		45	GNDA
21		46	GNDA
22		47	GNDA
23		48	GNDA
24		49	GNDA
25	OPERATE'	50	GNDA

1.3.3 UNIT 3 (Rear Panel Functional Description)

Figure 1.5 is a rear view of Model GPD550A Unit 3.

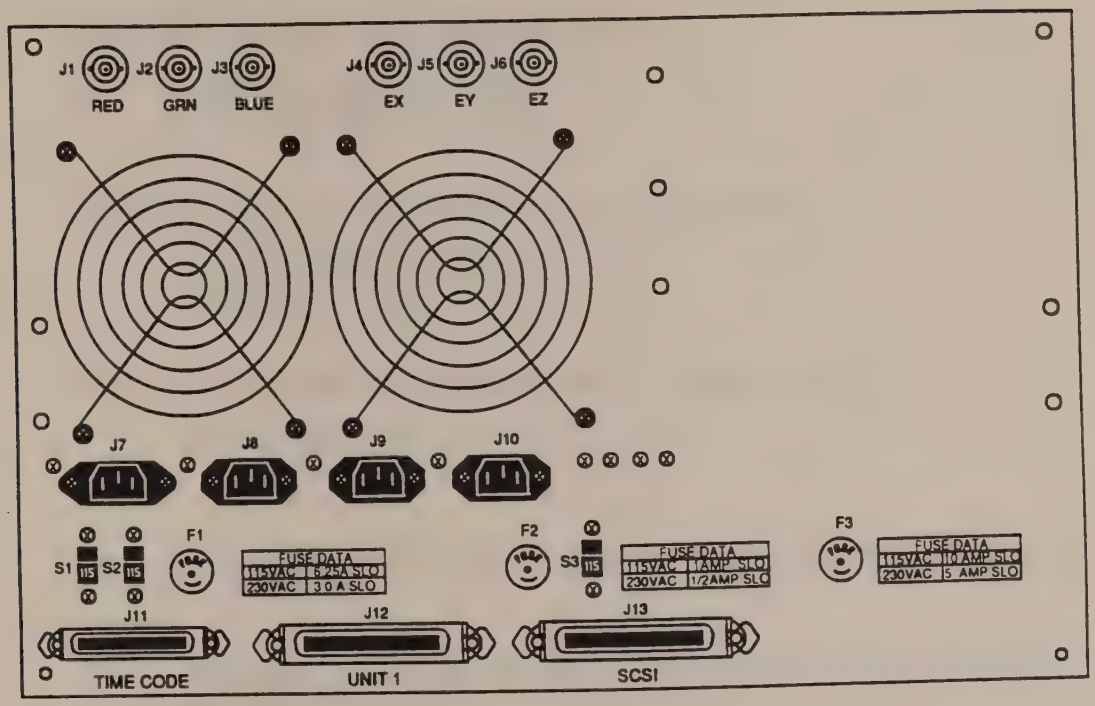


Figure 1.5. GPD550A Unit 3 Rear Panel

1.3.3.1 Power Input Group

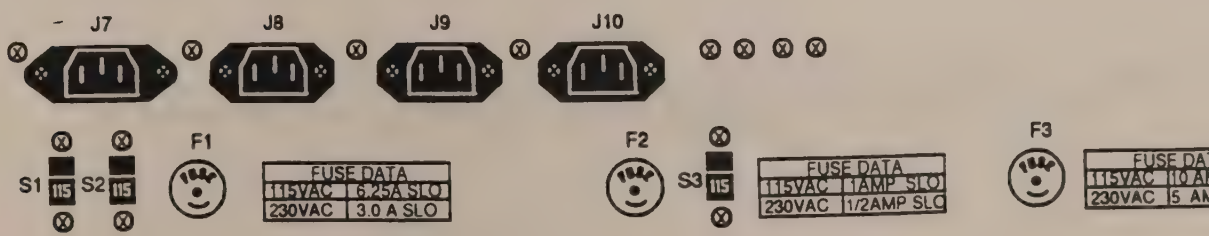


Figure 1.6. Power Input Group

Provides switching of primary power input circuits for either 115 Vac or 230 Vac operation.

Switch S1, S2, and S3 must be switched for 230V operation.

Fuse F1 is used to protect Unit 3.

6.25 amp SLO for 115V
3.0 amp SLO for 230V

Fuse F2 is used to protect the X-Y scope.

1 amp SLO for 115V
1/2 amp SLO for 230V

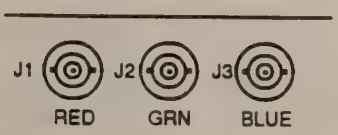
Fuse F3 is used to protect Unit 1 and Unit 2

10 amp SLO for 115V
5 amp SLO for 230V

J7: Accepts 3-wire female plus for line power 115/230 Vac, 50 to 60 Hz.

J8: Accepts 3-wire male plug to power Unit 1, Unit 2, and monitor.

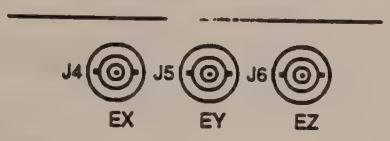
MONITOR Connection

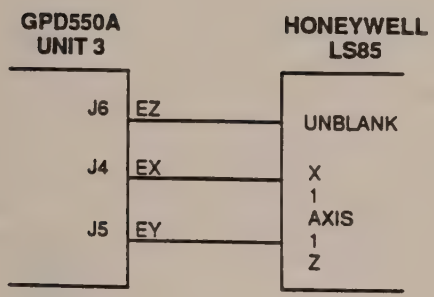


BNC's supply the RGB connection for the monitor. A video printer may be connected by connecting with the 'G' BNC.

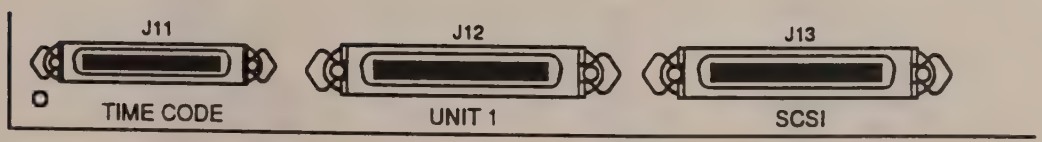
EXTERNAL Display Connection

Used for external monitors, Honeywell LS-85.





D Connectors



These connectors interface the GPD550A subsystems.

Time Code Connector J11

Receives 20-bit BCD input from a Time Code generator representing Hrs and Mins.

J12

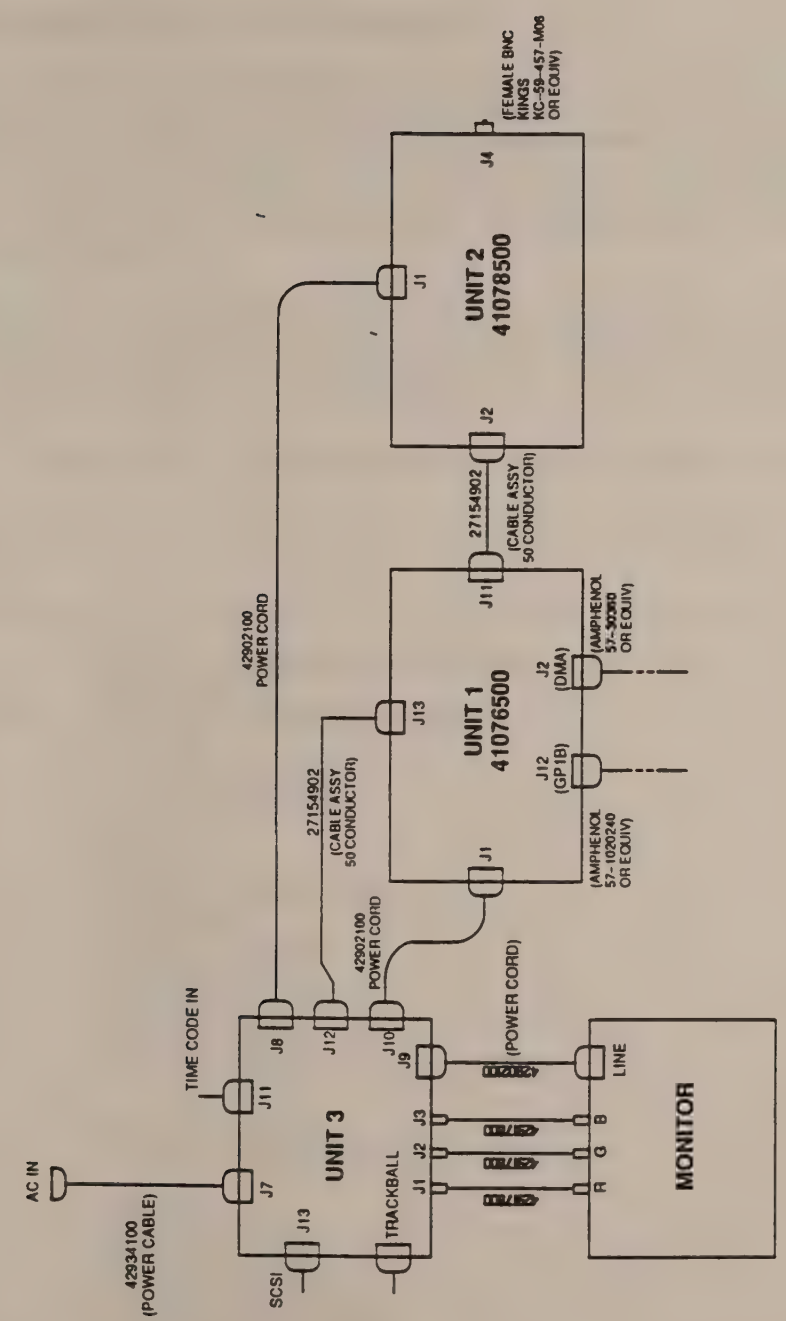
Accepts parallel REAL TIME and AVERAGE spectrum data with serial controls from GPD550A Unit 1 for 'Waterfall' display.

J13 SCSI (Small Computer System Interface)

This interface is capable of transferring data between the host and the GPD550A at a 5 Mbyte rate.

Table 1-9. Unit 3 Connector Pin Functions - J2
(Connects to Unit 1)

PIN	FUNCTION	PIN	FUNCTION
1	OUT16	26	OUT16'
2	OUT15	27	OUT15'
3	OUT14	28	OUT14'
4	OUT13	29	OUT13'
5	OUT12	30	OUT12'
6	OUT11	31	OUT11'
7	OUT10	32	OUT10'
8	OUT 9	33	OUT 9'
9	OUT 8	34	OUT 8'
10	OUT 7	35	OUT 7'
11	OUT 6	36	OUT 6'
12	OUT 5	37	OUT 5'
13	GND	38	GND
14	SL CLK	39	SL CLK'
15	SL ADDR	40	SL ADDR'
16	SL DATA	41	SL DATA'
17	SL OUT	42	SL OUT'
18	BPKDONE	43	BPKDONE'
19	SWP1	44	SWP1'
20	SWP2	45	SWP2'
21	LD DISP	46	LD DISP'
22	SL3 CLK	47	SL3 CLK'
23	SL3 ADDR	48	SL3 ADDR'
24	SL3 DATA	49	SL3 DATA'
25	SL3 OUT	50	SL3 OUT'


UNIT 2
41078500
J1
J2
J4
(FEMALE BNC
KINGS
KC-59-457-M06
OR EQUIV)
27154902
(CABLE ASSY
50 CONDUCTOR)
UNIT 1
41076500
J11
J13
J1
J2
(DMA)
J12
(GP1B)
(AMPHENOL
57-30360
OR EQUIV)
(AMPHENOL
57-1020240
OR EQUIV)
42902100
POWER CORD
27154902
(CABLE ASSY
50 CONDUCTOR)
42902100
POWER CORD
(POWER CORD)
UNIT 3
J8
J12
J10
J9
J11
J7
J13
J3
J2
J1
TIME CODE IN
AC IN
42934100
(POWER CABLE)
SCSI
TRACKBALL
R
G
B
LINE
MONITOR

SECTION 3
REPLACEABLE ASSEMBLIES

3.1 REPLACEABLE PARTS AND ASSEMBLIES

All repair parts for the GPD550A Digital Signal Analyzer may be ordered directly from Scientific-Atlanta, Signal Processing Systems (SPS) Division. However, except for some specification-controlled parts which must be ordered from the Signal Processing Systems Division, standard electronics parts have been used throughout the instrument. Table 3-1 provides a list of replaceable assemblies and chassis components.

When ordering a replacement part or assembly, be sure to include the reference designation, manufacturer's and/or SPS's part number, and a complete description, including the instrument name and model ;number, and instrument part number.

Table 3-1. Replaceable Assemblies and Parts

Reference Designator	Name	Part Number
UNIT 1		
A1	ADDRESS GENERATOR/TIMING	41009000
A2	TRANSLATOR	41008000
A3-A10	PRIMARY DIGITAL FILTER	40706000
A11	BUFFER	40707000
A12	DIGITAL FILTER	27990702
A13	INPUT MEMORY	41078000
A14	TIMING	40401000
A15	ALU	40402000
A16	OUTPUT CONVERTER	40407000
A17	AVERAGER	41080000
A18	OUTPUT TIMING	41079000
A19	HARDWARE CPU	41092000
A20	EXECUTIVE CPU	41093000
A21	SERIAL LINK	41081000
PS1	POWER SUPPLY ASSEMBLY	41081700
UNIT 2		
A1	A/D CONVERTER	42904600
A2	INPUT CONDITIONER	41003000
UNIT 3		
A4	CRT IF	41133000
A5	WATERFALL IF	41121000
A6	WATERFALL CPU	41118000
A7	WATERFALL VIDEO	41119000
A9	BUFFER CONTROLLER	41120000
A11-A13	WATERFALL MEMORY	41117000

3.2 STANDARD PARTS

Power Cords

Unit 3 to primary power	SA PN 42934100
Unit 3 to Unit 2	SA PN 42902100
Unit 3 to Unit 1	SA PN 42902100

Connector Cables

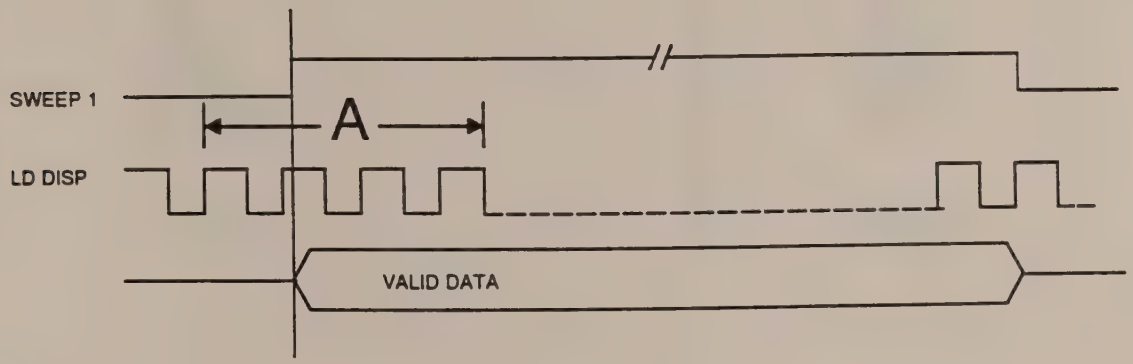
BNC Unit 3	SA PN 41094500
	SA PN 41094501
	SA PN 41094502
50-connector (Unit 3 to Unit 1)	SA PN 27154902
50-connector (Unit 1 to Unit 2)	SA PN 27154902

APPENDIX A

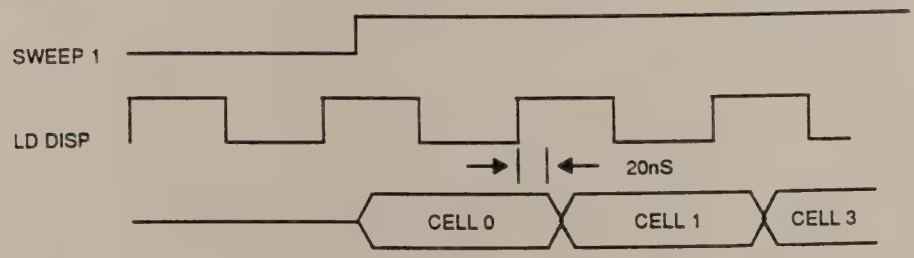
DMA INTERFACE INFORMATION

The high speed data is available from GPD550A at the processing speed of the unit. The 'SWEEP1' signal indicates the start of a valid data stream. Each data word is available at the positive transition of the clock cycle (period = 250 ns). The data outputted is Real Time only.

The timing is shown below:



EXPAND A

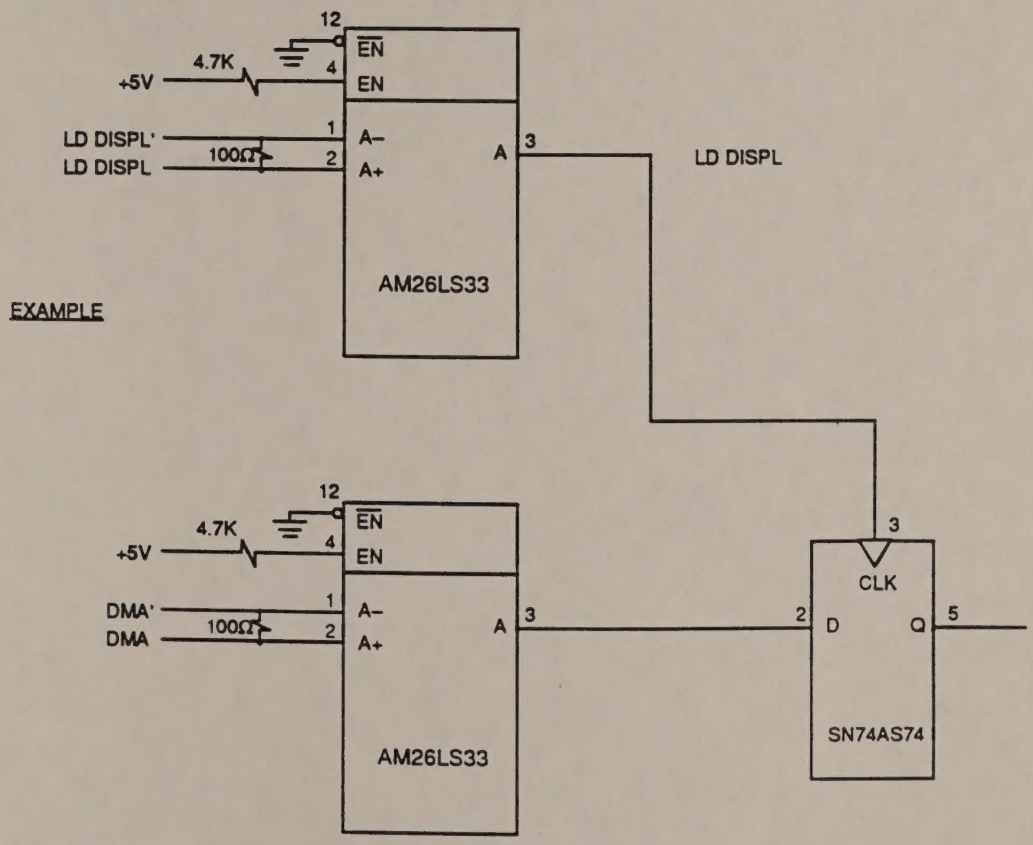


DMA Connector Interface:

Connector J2

Pin		Pin	
1	DMA 0	19	DMA 0'
2	DMA 1	20	DMA 1'
3	DMA 2	21	DMA 2'
4	DMA 3	22	DMA 3'
5	DMA 4	23	DMA 4'
6	DMA 5	24	DMA 5'
7	DMA 6	25	DMA 6'
8	DMA 7	26	DMA 7'
9	DMA 8	27	DMA 8'
10	DMA 9	28	DMA 9'
11	DMA10	29	DMA10'
12	DMA11	30	DMA11'
13	GNDE	31	GNDE
14	LD DISP	32	LD DISP'
15		33	
16		34	
17	SWEEP1	35	SWEEP1'
18		36	

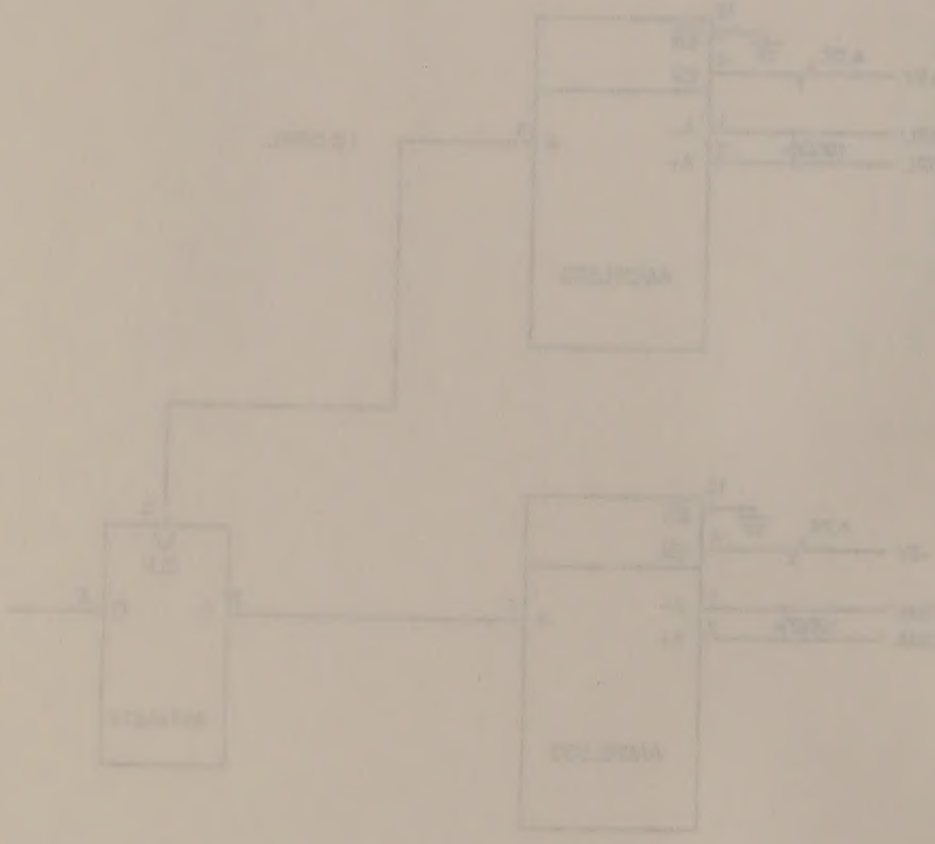
Recommended customer interface on clock, data and control lines:



dB CALCULATION:

CONVERT THE HEXADECIMAL NUMBER FROM THE DMA OUTPUT INTO DECIMAL. IF THE NUMBER IS X (DECIMAL):

$$dB = (X - 3433 / 49.04) + (dbgain)$$



MP MASTER
MA29850